

A study on the Bionomics of *Chauliops fallax* Scott (Heteroptera : Lygaeidae) at Sehore (Madhya Pradesh)¹

BY

R. R. RAWAT AND H. R. SAHU

Department of Entomology, J. N. Krishi Vishwa Vidyalyaya, Jabalpur

Phaseolus aureus ('Moong') and *P. mungo* ('Urid') are widely cultivated pulse crops in India. Among their various insect pests, *Chauliops fallax* Scott was noted to be the most important one at Sehore by the senior author during 1963 and 1964 and was subsequently also recorded feeding on these crops from Indore and Seoni districts in Madhya Pradesh. This is the first record of its occurrence and economic damage to these pulses in India. Distant (1904) gave a brief account of its characteristics, distribution and damage. He reported its distribution only in Ceylon and Japan. Young (1960) reported its occurrence in Western Hunan (China) and studied its biology during 1957-58. Schwarz (1927) and Van Der Goot (1928, 1929) reported an allied species *C. bisontula* Banks as the most important pest of green manure plant in Dutch East Indies. An earlier report (Fletcher 1919) records its occurrence and damage to Soybeans in Kumaon, U.P., in India.

MATERIALS AND METHODS

Mass collections of nymphs were made from the fields in July-August for rearing in laboratory. The adults reared in laboratory and the copulating pairs collected from the fields were confined in glass jars on potted plants to record oviposition, longevity etc. Freshly hatched nymphs were reared singly on tender leaves of host plants in petridishes to study the life history. The average monthly minimum and maximum room temperature during the course of studies (July to October) ranged between 28.3 to 30.8°C and 30.5 to 33.3°C, respectively, while the relative humidity ranged from 68 to 86 per cent. The incidence of the pest was recorded at 10 days interval on 50 randomly selected and tagged plants.

¹Accepted November 11, 1968.

RESULTS AND DISCUSSION

Host Plants :

Previously, the pest has been reported feeding only on *Dolichos unguiculata* in Ceylon (Distant 1904) and on soybean in Western Hunan (China) (Young 1960) and India (Fletcher 1919). During the course of present study the pest was mostly found feeding on 'Moong' and 'Urid'. It was also occasionally observed on soybean, cowpea and 'moth bean' (*Phaseolus acontifolius*); the lesser suitability of these plants was also found in laboratory due to higher mortality of young nymphs when reared on them. All these plants, except soybean, are the new host records of the pest.

Nature and extent of damage and seasonal incidence :

Both nymphs and adults suck the cell sap from the leaves and tender shoots. Badly damaged leaves show several minute whitish spots caused by feeding and small black pustules formed by the dried up excreta of the pest. The attacked leaves gradually wither due to drain of sap and subsequently fall off the plants. The badly infested plants thus lose all leaves and die prematurely. The severity of damage was maximum on 'Moong' and 'Urid' during August-September when more than 75% plants were infested and more than 50% leaves fell off the attacked plants.

The data on the seasonal incidence of the pest are given in Table 1. The pest was active from second week of July to third week of October. The incidence was at its peak during August-September, when up to 45 nymphs and 12 adults were recorded per plant and up to 20 nymphs and 7 adults per leaf.

TABLE 1
SEASONAL INCIDENCE OF *C. fallax*

Date of Observation	Average population per plant	
	Nymphs	Adults
11.vii.1964	Nil	1.0
21.vii.1964	Nil	1.0
31.vii.1964	4.4	2.5
10.viii.1964	12.5	2.5
20.viii.1964	17.5	6.8
30.viii.1964	18.5	7.5
9.ix.1964	15.5	7.0
19.ix.1964	10.5	6.5
29.ix.1964	7.5	6.0
9.x.1964	3.5	5.0
19.x.1964	Nil	1.0

Life history and description of Stages :

Mating : Mating occurred freely in the field but failed to occur in confinement. Copulating pairs were observed in the field any time during day but mostly during morning and evening. The time taken in mating varied from 100 to 135 minutes, with an average of 118 minutes.

Oviposition : Eggs are laid singly attached to the plant hairs on leaves and tender shoots, but mostly on the basal part of the lower surface of leaves, during night as well as day. The female first exudes a darkish fluid on a plant hair and then deposits an egg on it. The fluid soon dries up thus keeping the egg attached to the hair. When copulating pairs were collected from the field and confined on potted plants, only 4 to 8 eggs were laid per female in one or two days after which oviposition stopped.

Egg : The freshly laid egg is smooth and shining. Light brown in colour later changing to dark brown. It is oval in shape, measuring about 0.63×0.31 mm with a slight convexity on one side and the corresponding slight concavity on the other side. Incubation period, during August, ranged from 8 to 10 days (average 9.1 days) and the egg viability ranged from 50 to 75% (average 64.8%).

Hatching occurs during night as well as day, but mostly during night. While hatching, the lid at the anterior end of the egg is pushed open by the nymph but it remains partly attached to the egg shell. Through this opening, the nymph first protrudes its head and then gradually wriggles out completely.

Nymph : The nymphs undergo five moults to reach the adult stage. After hatching, the tiny young pinkish red nymphs are often found in groups up to 3rd instar on the basal part of the undersurface of leaves. The older nymphs subsequently get dispersed. The average durations of 1st to 5th nymphal instars and total nymphal period, during August-September, were 3.15, 3.75, 3.95, 4.15, 5.30 and 20.30 days, respectively with slight variation in different weeks.

First instar : It is oval in shape and measures about 0.66×0.28 mm in the beginning, later increasing to about 0.72×0.39 mm. The freshly hatched nymph is shiny light pinkish red. Later, the general body colour deepens to dark pinkish red, while the thorax and basal part of abdomen turn dark brown dorsally. Minute clubbed hairs, borne on slightly raised tubercles, are distributed all over the dorsal side of the body and head. The hairs on the legs and 3rd and 4th antennal segments are, however, simple and unclubbed. The 1st and 2nd antennal segments are reddish, while the 3rd and 4th segments are whitish. The coxae and femora are red; the remaining parts of the legs are

pale whitish. Tarsi are two-segmented. Paired lateral claws are small, curved and dark brown.

Second instar : Measures about 0.86×0.41 mm, later increasing to 1.08×0.72 mm. The freshly moulted nymph is light pinkish with a yellowish tinge along the lateral margins of the abdomen. Later, the colour becomes reddish brown. The 1st, 2nd and distal part of the 4th antennal segments and the proximal parts of legs up to the basal part of tibiae are reddish brown ; the remaining parts are light yellowish.

Third instar : Measures about 1.23×0.78 mm, later increasing to 1.44×0.84 mm. The parts having reddish brown colour in the second instar become dark brown in this instar. Lateral abdominal margins are pale yellowish and there is a transverse narrow pinkish band on either side of the dorsum of each abdominal segment.

Fourth instar : Measures about 1.50×0.86 mm, later increasing to 1.80×0.95 mm. The body colour is similar to that of third instar. Small triangular wing lobes appear in this instar. Ventrally, there are two dark circular raised spots on each abdominal segment.

Fifth instar : Measures about 1.84×1.00 mm, later increasing to 2.41×1.08 mm. The dark brown wing lobes now extend up to the middle of the abdomen.

Ecdysis : A few hours before each ecdysis the nymph stops feeding and its colour becomes somewhat dull. The old cuticle ruptures along the mid-dorsal region of the thorax and through the rupture the thoracic region of the next instar protrudes out. The legs, head and abdomen are then gradually extricated out of the old cuticle by the bending movements. Within half an hour the process of ecdysis is completed and the exuviae is completely shed. Just after ecdysis the nymph is sluggish and pale but after sometime it becomes active and darker in colour.

Adult : The adult is elongate, oval. The female measures about 2.59×1.26 mm and the male 2.50×1.08 mm. The females are dark brown whereas the males are pale brownish. The body is slightly constricted at the junction of the thorax and abdomen on either side and bears minute whitish mealy patches and minute filamentous hairs, arising from slightly raised tubercles. The head is broad and cone-shaped with dark stylated compound eyes and 4-segmented antennae. The rostrum is pale brownish, 4-segmented and elongate.

Total life cycle : The total life cycle from egg to adult, during August-September (average temperature 30°C to 33.3°C), varied from 27 to 31 days. This is in conformity with the findings of Young (1960), who reported the length of one life cycle as 33 days at $24-26^{\circ}\text{C}$.

Sex-ratio and longevity : Based on the examination of 70 adults that emerged in laboratory rearing, the average ratio of females to males was found to be 1.5 : 1.

The longevity of adult males and females varied from 20 to 28 days (average 24.4 days) and 24 to 30 days (average 27.6 days), respectively.

ACKNOWLEDGEMENTS

We are grateful to Shri H. P. Dwivedi, the then Principal, R.A.K. Agriculture College, Sehore, for providing necessary facilities and to the Director of Commonwealth Institute of Entomology, London, for identification of the pest.

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